



## SEQUENCE LISTING

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<120> METHODS FOR PRODUCING IMMUNOGLOBULINS  
CONTAINING PROTECTION PROTEINS IN PLANTS AND THEIR USE

<130> 415142000303

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<141> 2004-02-18

<150> 08/434,000

<151> 1995-05-04

<150> 08/367,395

<151> 1994-12-30

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Gly Tyr Val Ser Asp Asp Tyr Val Gly Arg Ala Asn Leu Thr Asn Phe
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Pro Glu Ser Gly Thr Phe Val Val Asp Ile Ser His Leu Thr His Lys
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Asp Ser Gly Arg Tyr Lys Cys Gly Leu Gly Ile Ser Ser Arg Gly Leu
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Asn Phe Asp Val Ser Leu Glu Val Ser Gln Asp Pro Ala Gln Ala Ser
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His Ala His Val Tyr Thr Ile Asp Leu Gly Arg Thr Val Thr Ile Asn
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Asn Ile Asp Leu Gln Val Leu Glu Pro Glu Pro Glu Leu Val Tyr Gly	235	240	245	
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Asp Leu Arg Ser Ser Val Thr Phe Asp Cys Ser Leu Gly Pro Glu Val	250	255	260	
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Ala Asn Val Pro Lys Phe Leu Cys Gln Lys Lys Asn Gly Gly Ala Cys	265	270	275	
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Asn Val Val Ile Asn Thr Leu Gly Lys Lys Ala Gln Asp Phe Gln Gly	280	285	290	295
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Arg Ile Val Ser Val Pro Lys Asp Asn Gly Val Phe Ser Val His Ile	300	305	310	
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Thr Ser Leu Arg Lys Glu Asp Ala Gly Arg Tyr Val Cys Gly Ala Gln	315	320	325	
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Tyr Glu Gly Arg Leu Val Leu Leu Thr Glu Pro Gly Asn Gly Thr Tyr	410	415	420	
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 565 570 575  
 Ala Pro Ala Gly Ala Ala Ile Gln Ser Arg Ala Gly Glu Ile Gln Asn  
 580 585 590  
 Lys Ala Leu Leu Asp Pro Ser Phe Phe Ala Lys Glu Ser Val Lys Asp  
 595 600 605  
 Ala Ala Gly Gly Pro Gly Ala Pro Ala Asp Pro Gly Arg Pro Thr Gly  
 610 615 620  
 Tyr Ser Gly Ser Ser Lys Ala Leu Val Ser Thr Leu Val Pro Leu Ala  
 625 630 635 640  
 Leu Val Leu Val Ala Gly Val Val Ala Ile Gly Val Val Arg Ala Arg  
 645 650 655  
 His Arg Lys Asn Val Asp Arg Ile Ser Ile Arg Ser Tyr Arg Thr Asp  
 660 665 670  
 Ile Ser Met Ser Asp Phe Glu Asn Ser Arg Asp Phe Glu Gly Arg Asp  
 675 680 685  
 Asn Met Gly Ala Ser Pro Glu Ala Gln Glu Thr Ser Leu Gly Gly Lys  
 690 695 700  
 Asp Glu Phe Ala Thr Thr Thr Glu Asp Thr Val Glu Ser Lys Glu Pro  
 705 710 715 720  
 Lys Lys Ala Lys Arg Ser Ser Lys Glu Glu Ala Asp Glu Ala Phe Thr  
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 cagccccctt ggaagccaca agca atg agg ctc tac ttg ttc acg ctc ttg 111  
 Met Arg Leu Tyr Leu Phe Thr Leu Leu  
 1 5  
  
 gta act gtc ttt tca ggg gtc tcc aca aaa agc ccc ata ttt ggt ccc 159  
 Val Thr Val Phe Ser Gly Val Ser Thr Lys Ser Pro Ile Phe Gly Pro  
 10 15 20 25  
  
 cag gag gtg agt agt ata gaa ggc gac tct gtt tcc atc acg tgc tac 207  
 Gln Glu Val Ser Ser Ile Glu Gly Asp Ser Val Ser Ile Thr Cys Tyr

	30	35	40	
tac cca gac acc tct gtc aac cgg cac acc cgg aaa tac tgg tgc cga				255
Tyr Pro Asp Thr Ser Val Asn Arg His Thr Arg Lys Tyr Trp Cys Arg	45	50	55	
caa gga gcc agc ggc atg tgc aca acg ctc atc tct tca aat ggc tac				303
Gln Gly Ala Ser Gly Met Cys Thr Leu Ile Ser Ser Asn Gly Tyr	60	65	70	
ctc tcc aag gag tat tca ggc aga gcc aac ctc atc aac ttc cca gag				351
Leu Ser Lys Glu Tyr Ser Gly Arg Ala Asn Leu Ile Asn Phe Pro Glu	75	80	85	
aac aac aca ttt gtg att aac att gag cag ctc acc cag gac gac act				399
Asn Asn Thr Phe Val Ile Asn Ile Glu Gln Leu Thr Gln Asp Asp Thr	90	95	100	105
ggg agc tac aag tgt ggc ctg ggt acc agt aac cga ggc ctg tcc ttc				447
Gly Ser Tyr Lys Cys Gly Leu Gly Thr Ser Asn Arg Gly Leu Ser Phe	110	115	120	
gat gtc agc ctg gag gtc agc cag gtt cct gag ttg ccg agt gac acc				495
Asp Val Ser Leu Glu Val Ser Gln Val Pro Glu Leu Pro Ser Asp Thr	125	130	135	
cac gtc tac aca aag gac ata ggc aga aat gtg acc att gaa tgc cct				543
His Val Tyr Thr Lys Asp Ile Gly Arg Asn Val Thr Ile Glu Cys Pro	140	145	150	
ttc aaa agg gag aat gtt ccc agc aag aaa tcc ctg tgt aag aag aca				591
Phe Lys Arg Glu Asn Val Pro Ser Lys Lys Ser Leu Cys Lys Lys Thr	155	160	165	
aac cag tcc tgc gaa ctt gtc att gac tct act gag aag gtg aac ccc				639
Asn Gln Ser Cys Glu Leu Val Ile Asp Ser Thr Glu Lys Val Asn Pro	170	175	180	185
agc tat ata ggc aga gca aaa ctt ttt atg aaa ggg acc gac cta act				687
Ser Tyr Ile Gly Arg Ala Lys Leu Phe Met Lys Gly Thr Asp Leu Thr	190	195	200	
gta ttc tat gtc aac att agt cac cta acg cac aat gat gct ggg ctg				735
Val Phe Tyr Val Asn Ile Ser His Leu Thr His Asn Asp Ala Gly Leu	205	210	215	
tac atc tgc caa gct gga gaa ggt cct agt gct gat aag aag aat gtt				783
Tyr Ile Cys Gln Ala Gly Glu Gly Pro Ser Ala Asp Lys Lys Asn Val	220	225	230	
gac ctc cag gtg cta gcg cct gag cca gag ctg ctt tat aaa gac ctg				831
Asp Leu Gln Val Leu Ala Pro Glu Pro Glu Leu Leu Tyr Lys Asp Leu	235	240	245	
agg tcc tca gtg act ttt gaa tgt gac ctg ggc cgt gag gtg gca aac				879
Arg Ser Ser Val Thr Phe Glu Cys Asp Leu Gly Arg Glu Val Ala Asn	250	255	260	265

gag gcc aaa tat ctg tgc cgg atg aat aag gaa acc tgt gat gtg atc Glu Ala Lys Tyr Leu Cys Arg Met Asn Lys Glu Thr Cys Asp Val Ile 270 275 280	927
att aac acc ctg ggg aag agg gat cca gac ttt gag ggc agg atc ctg Ile Asn Thr Leu Gly Lys Arg Asp Pro Asp Phe Glu Gly Arg Ile Leu 285 290 295	975
ata acc ccc aag gat gac aat ggc cgc ttc agt gtg ttg atc aca ggc Ile Thr Pro Lys Asp Asp Asn Gly Arg Phe Ser Val Leu Ile Thr Gly 300 305 310	1023
ctg agg aag gag gat gca ggg cac tac cag tgt gga gcc cac agt tct Leu Arg Lys Glu Asp Ala Gly His Tyr Gln Cys Gly Ala His Ser Ser 315 320 325	1071
ggt ttg cct caa gaa ggc tgg ccc atc cag act tgg caa ctc ttt gtc Gly Leu Pro Gln Glu Gly Trp Pro Ile Gln Thr Trp Gln Leu Phe Val 330 335 340 345	1119
aat gaa gag tct acc att ccc aat cgt cgc tct gtt gtg aag gga gtc Asn Glu Glu Ser Thr Ile Pro Asn Arg Arg Ser Val Val Lys Gly Val 350 355 360	1167
aca gga ggc tct gtg gcc atc gcc tgt ccc tat aac ccc aag gaa agc Thr Gly Gly Ser Val Ala Ile Ala Cys Pro Tyr Asn Pro Lys Glu Ser 365 370 375	1215
agc agc ctc aag tac tgg tgt cgc tgg gaa ggg gac gga aat gga cat Ser Ser Leu Lys Tyr Trp Cys Arg Trp Glu Gly Asp Gly Asn Gly His 380 385 390	1263
tgc ccc gcg ctt gtg ggg acc cag gcc cag gtg caa gaa gag tat gaa Cys Pro Ala Leu Val Gly Thr Gln Ala Gln Val Gln Glu Glu Tyr Glu 395 400 405	1311
ggc cga ctg gca ctg ttt gat cag cca ggc aat ggt act tac act gtc Gly Arg Leu Ala Leu Phe Asp Gln Pro Gly Asn Gly Thr Tyr Thr Val 410 415 420 425	1359
atc ctc aac cag ctc acc acc gag gat gct ggc ttc tat tgg tgt ctt Ile Leu Asn Gln Leu Thr Thr Glu Asp Ala Gly Phe Tyr Trp Cys Leu 430 435 440	1407
acc aat ggt gac tct cgc tgg aga acc aca ata gaa ctc cag gtt gcc Thr Asn Gly Asp Ser Arg Trp Arg Thr Thr Ile Glu Leu Gln Val Ala 445 450 455	1455
gaa gct aca agg gag cca aac ctt gag gtg acg cca cag aac gca aca Glu Ala Thr Arg Glu Pro Asn Leu Glu Val Thr Pro Gln Asn Ala Thr 460 465 470	1503
gca gta cta gga gag acc ttc acc gtt tcc tgc cac tat ccg tgc aaa Ala Val Leu Gly Glu Thr Phe Thr Val Ser Cys His Tyr Pro Cys Lys 475 480 485	1551

ttc tac tcc cag gag aaa tac tgg tgc aag tgg agc aac aag ggt tgc	1599
Phe Tyr Ser Gln Glu Lys Tyr Trp Cys Lys Trp Ser Asn Lys Gly Cys	
490 495 500 505	
cac atc ctg cca agc cat gac gaa ggt gcc cgc caa tct tct gtg agc	1647
His Ile Leu Pro Ser His Asp Glu Gly Ala Arg Gln Ser Ser Val Ser	
510 515 520	
tgc gac cag agc agc cag ctg gtc tcc atg acc ctg aac ccg gtc agt	1695
Cys Asp Gln Ser Ser Gln Leu Val Ser Met Thr Leu Asn Pro Val Ser	
525 530 535	
aag gaa gat gaa ggc tgg tac tgg tgt ggg gta aag caa ggc cag acc	1743
Lys Glu Asp Glu Gly Trp Tyr Trp Cys Gly Val Lys Gln Gly Gln Thr	
540 545 550	
tat gga gaa act acc gcc atc tat ata gca gtt gaa gag agg acc aga	1791
Tyr Gly Glu Thr Thr Ala Ile Tyr Ile Ala Val Glu Glu Arg Thr Arg	
555 560 565	
ggg tca tcc cat gtc aac cca aca gat gca aat gca cgt gcc aaa gtc	1839
Gly Ser Ser His Val Asn Pro Thr Asp Ala Asn Ala Arg Ala Lys Val	
570 575 580 585	
gct ctg gaa gaa gag gta gtg gac tcc tcc atc agt gaa aaa gag aac	1887
Ala Leu Glu Glu Val Val Asp Ser Ser Ile Ser Glu Lys Glu Asn	
590 595 600	
aaa gcc att cca aat ccc ggg cct ttt gcc aac gaa aga gag ata cag	1935
Lys Ala Ile Pro Asn Pro Gly Pro Phe Ala Asn Glu Arg Glu Ile Gln	
605 610 615	
aat gtg aga gac caa gct cag gag aac aga gca tct ggg gat gct ggc	1983
Asn Val Arg Asp Gln Ala Gln Glu Asn Arg Ala Ser Gly Asp Ala Gly	
620 625 630	
agt gct gat gga caa agc agg agc tcc agc tcc aaa gtg ctg ttc tcc	2031
Ser Ala Asp Gly Gln Ser Arg Ser Ser Ser Ser Lys Val Leu Phe Ser	
635 640 645	
acc ctg gtg ccc ctg ggt ctg gtg ctg gca gtg ggt gct ata gct gtg	2079
Thr Leu Val Pro Leu Gly Leu Val Leu Ala Val Gly Ala Ile Ala Val	
650 655 660 665	
tgg gtg gcc aga gtc cga cat cgg aag aat gta gac cgc atg tca atc	2127
Trp Val Ala Arg Val Arg His Arg Lys Asn Val Asp Arg Met Ser Ile	
670 675 680	
agc agc tac agg aca gac att agc atg gca gac ttc aag aac tcc aga	2175
Ser Ser Tyr Arg Thr Asp Ile Ser Met Ala Asp Phe Lys Asn Ser Arg	
685 690 695	
gat ttg gga ggc aat gac aac atg ggg gcc tct cca gac aca cag caa	2223
Asp Leu Gly Gly Asn Asp Asn Met Gly Ala Ser Pro Asp Thr Gln Gln	
700 705 710	
aca gtc atc gaa gga aaa gat gaa atc gtg act acc acg gag tgc acc	2271

Thr Val Ile Glu Gly Lys Asp Glu Ile Val Thr Thr Thr Glu Cys Thr  
715 720 725

gct gag cca gaa gaa tcc aag aaa gca aaa agg tca tcc aag gag gaa 2319  
Ala Glu Pro Glu Glu Ser Lys Lys Ala Lys Arg Ser Ser Lys Glu Glu  
730 735 740 745

gct gac atg gcc tac tcg gca ttc ctg ctt cag tcc agc acc ata gct 2367  
Ala Asp Met Ala Tyr Ser Ala Phe Leu Leu Gln Ser Ser Thr Ile Ala  
750 755 760

gca cag gtc cac gat ggt ccc cag gaa gcc tag gcagtgtga ccacccaccc 2420  
Ala Gln Val His Asp Gly Pro Gln Glu Ala \*

765 770

ttgcctgtga caatcaactt gagaatcaca ctgatccgct cgcagccac actcaccat 2480  
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aaaaaaaa aaaaa 3095

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Gly Asp Ser Val Ser Ile Thr Cys Tyr Tyr Pro Asp Thr Ser Val Asn  
35 40 45  
Arg His Thr Arg Lys Tyr Trp Cys Arg Gln Gly Ala Ser Gly Met Cys  
50 55 60  
Thr Thr Leu Ile Ser Ser Asn Gly Tyr Leu Ser Lys Glu Tyr Ser Gly  
65 70 75 80  
Arg Ala Asn Leu Ile Asn Phe Pro Glu Asn Asn Thr Phe Val Ile Asn  
85 90 95  
Ile Glu Gln Leu Thr Gln Asp Asp Thr Gly Ser Tyr Lys Cys Gly Leu  
100 105 110  
Gly Thr Ser Asn Arg Gly Leu Ser Phe Asp Val Ser Leu Glu Val Ser  
115 120 125  
Gln Val Pro Glu Leu Pro Ser Asp Thr His Val Tyr Thr Lys Asp Ile  
130 135 140  
Gly Arg Asn Val Thr Ile Glu Cys Pro Phe Lys Arg Glu Asn Val Pro  
145 150 155 160  
Ser Lys Lys Ser Leu Cys Lys Lys Thr Asn Gln Ser Cys Glu Leu Val  
165 170 175  
Ile Asp Ser Thr Glu Lys Val Asn Pro Ser Tyr Ile Gly Arg Ala Lys



Ser Ser Ser Ser Lys Val Leu Phe Ser Thr Leu Val Pro Leu Gly Leu  
                   645                                  650                  655  
 Val Leu Ala Val Gly Ala Ile Ala Val Trp Val Ala Arg Val Arg His  
                   660                                  665                  670  
 Arg Lys Asn Val Asp Arg Met Ser Ile Ser Ser Tyr Arg Thr Asp Ile  
                   675                                  680                  685  
 Ser Met Ala Asp Phe Lys Asn Ser Arg Asp Leu Gly Gly Asn Asp Asn  
                   690                                  695                  700  
 Met Gly Ala Ser Pro Asp Thr Gln Gln Thr Val Ile Glu Gly Lys Asp  
 705                                  710                                  715                                  720  
 Glu Ile Val Thr Thr Thr Glu Cys Thr Ala Glu Pro Glu Glu Ser Lys  
                                   725                                  730                                  735  
 Lys Ala Lys Arg Ser Ser Lys Glu Glu Ala Asp Met Ala Tyr Ser Ala  
                                   740                                  745                                  750  
 Phe Leu Leu Gln Ser Ser Thr Ile Ala Ala Gln Val His Asp Gly Pro  
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                   Met Arg Leu Ser Leu Phe Ala Leu Leu Val Thr Val  
                                   1                                  5                                  10  
  
 ttc tca ggg gtc tcc aca caa agc ccc ata ttt ggt ccc cag gat gtg 157  
 Phe Ser Gly Val Ser Thr Gln Ser Pro Ile Phe Gly Pro Gln Asp Val  
                   15                                  20                                  25  
  
 agt agt att gaa ggt aac tcg gtc tcc atc acg tgc tac tac cca gac 205  
 Ser Ser Ile Glu Gly Asn Ser Val Ser Ile Thr Cys Tyr Tyr Pro Asp  
                   30                                  35                                  40  
  
 acc tct gtc aac cgg cac acc cgg aaa tac tgg tgc cga caa gga gcc 253  
 Thr Ser Val Asn Arg His Thr Arg Lys Tyr Trp Cys Arg Gln Gly Ala  
                   45                                  50                                  55                                  60  
  
 aac ggc tac tgc gca acc ctc atc tct tca aat ggc tac ctc tcg aag 301  
 Asn Gly Tyr Cys Ala Thr Leu Ile Ser Ser Asn Gly Tyr Leu Ser Lys  
                                   65                                  70                                  75  
  
 gag tat tca ggc aga gcc agc ctc atc aac ttc cca gag aat agc aca 349  
 Glu Tyr Ser Gly Arg Ala Ser Leu Ile Asn Phe Pro Glu Asn Ser Thr  
                   80                                  85                                  90  
  
 ttt gtg att aac att gca cat ctc acc cag gag gac act ggg agc tac 397  
 Phe Val Ile Asn Ile Ala His Leu Thr Gln Glu Asp Thr Gly Ser Tyr



95						100						105						
aag	tgt	ggt	ctg	ggt	acc	act	aac	cga	ggc	ctg	ttt	ttc	gat	gtc	agc	445		
Lys	Cys	Gly	Leu	Gly	Thr	Thr	Asn	Arg	Gly	Leu	Phe	Phe	Asp	Val	Ser			
110						115			120									
ctg	gag	gtc	agc	cag	gtt	cct	gag	ttc	cca	aat	gac	acc	cat	gtc	tac	493		
Leu	Glu	Val	Ser	Gln	Val	Pro	Glu	Phe	Pro	Asn	Asp	Thr	His	Val	Tyr			
125			130			135						140						
aca	aag	gac	ata	ggc	aga	act	gtg	acc	atc	gaa	tgc	cgt	ttc	aaa	gag	541		
Thr	Lys	Asp	Ile	Gly	Arg	Thr	Val	Thr	Ile	Glu	Cys	Arg	Phe	Lys	Glu			
			145						150			155						
ggg	aat	gct	cat	agc	aag	aaa	tcc	ctg	tgt	aag	aag	aga	gga	gag	gcc	589		
Gly	Asn	Ala	His	Ser	Lys	Lys	Ser	Leu	Cys	Lys	Lys	Arg	Gly	Glu	Ala			
			160			165						170						
tgc	gaa	gtt	gtc	atc	gac	tct	act	gag	tac	gtg	gac	ccc	agc	tat	aag	637		
Cys	Glu	Val	Val	Ile	Asp	Ser	Thr	Glu	Tyr	Val	Asp	Pro	Ser	Tyr	Lys			
175						180						185						
gac	aga	gca	atc	ctt	ttt	atg	aaa	ggg	acc	agc	cgc	gat	ata	ttc	tat	685		
Asp	Arg	Ala	Ile	Leu	Phe	Met	Lys	Gly	Thr	Ser	Arg	Asp	Ile	Phe	Tyr			
190						195						200						
gtc	aac	att	agc	cac	cta	ata	ccc	agt	gat	gct	gga	ctg	tat	gtt	tgc	733		
Val	Asn	Ile	Ser	His	Leu	Ile	Pro	Ser	Asp	Ala	Gly	Leu	Tyr	Val	Cys			
205			210						215			220						
caa	gct	gga	gaa	ggc	ccc	agt	gct	gat	aaa	aat	aat	gct	gac	ctc	cag	781		
Gln	Ala	Gly	Glu	Gly	Pro	Ser	Ala	Asp	Lys	Asn	Asn	Ala	Asp	Leu	Gln			
			225						230			235						
gtg	cta	gag	cct	gag	cca	gag	ctg	ctt	tat	aaa	gac	ctg	agg	tcc	tca	829		
Val	Leu	Glu	Pro	Glu	Pro	Glu	Leu	Leu	Tyr	Lys	Asp	Leu	Arg	Ser	Ser			
			240			245						250						
gtg	act	ttt	gaa	tgt	gac	ctg	ggc	cgt	gaa	gtg	gca	aat	gat	gcc	aaa	877		
Val	Thr	Phe	Glu	Cys	Asp	Leu	Gly	Arg	Glu	Val	Ala	Asn	Asp	Ala	Lys			
255						260						265						
tat	ctg	tgt	cgg	aag	aac	aag	gaa	acc	tgt	gat	gtc	atc	atc	aac	acc	925		
Tyr	Leu	Cys	Arg	Lys	Asn	Lys	Glu	Thr	Cys	Asp	Val	Ile	Ile	Asn	Thr			
270						275						280						
ctg	ggg	aag	aga	gat	cca	gcc	ttt	gaa	ggc	agg	atc	ctg	cta	acc	ccc	973		
Leu	Gly	Lys	Arg	Asp	Pro	Ala	Phe	Glu	Gly	Arg	Ile	Leu	Leu	Thr	Pro			
285			290						295			300						
agg	gat	gac	aat	ggc	cgc	ttc	agt	gtg	ttg	atc	aca	ggc	ctg	agg	aag	1021		
Arg	Asp	Asp	Asn	Gly	Arg	Phe	Ser	Val	Leu	Ile	Thr	Gly	Leu	Arg	Lys			
			305			310						315						
gag	gat	gca	ggg	cac	tac	cag	tgt	gga	gcg	cac	agt	tct	ggt	ttg	cct	1069		
Glu	Asp	Ala	Gly	His	Tyr	Gln	Cys	Gly	Ala	His	Ser	Ser	Gly	Leu	Pro			
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Gln Glu Gly Trp Pro Val Gln Ala Trp Gln Leu Phe Val Asn Glu Glu	
335 340 345	
tcc acg att ccc aat agt cgc tct gtt gtg aag ggt gtc aca gga ggc	1165
Ser Thr Ile Pro Asn Ser Arg Ser Val Val Lys Gly Val Thr Gly Gly	
350 355 360	
tct gtg gcc atc gtc tgt ccc tat aac ccc aag gaa agc agc agc ctc	1213
Ser Val Ala Ile Val Cys Pro Tyr Asn Pro Lys Glu Ser Ser Ser Leu	
365 370 375 380	
aag tac tgg tgt cac tgg gaa gcc gac gag aat gga cgc tgc ccg gtg	1261
Lys Tyr Trp Cys His Trp Glu Ala Asp Glu Asn Gly Arg Cys Pro Val	
385 390 395	
ctc gtg ggg acc cag gcc ctg gtg caa gaa gga tat gaa ggc cga ctg	1309
Leu Val Gly Thr Gln Ala Leu Val Gln Glu Gly Tyr Glu Gly Arg Leu	
400 405 410	
gca ctg ttc gat cag ccg ggc agt ggc gcc tac act gtc atc ctc aac	1357
Ala Leu Phe Asp Gln Pro Gly Ser Gly Ala Tyr Thr Val Ile Leu Asn	
415 420 425	
cag ctc acc acc cag gat tct ggc ttc tac tgg tgt ctt acc gat ggt	1405
Gln Leu Thr Thr Gln Asp Ser Gly Phe Tyr Trp Cys Leu Thr Asp Gly	
430 435 440	
gac tct cgc tgg aga acc acg ata gaa ctg cag gtt gct gaa gct aca	1453
Asp Ser Arg Trp Arg Thr Thr Ile Glu Leu Gln Val Ala Glu Ala Thr	
445 450 455 460	
aag aag cca gac ctt gag gtg aca cca cag aac gcg acc gcg gtg ata	1501
Lys Lys Pro Asp Leu Glu Val Thr Pro Gln Asn Ala Thr Ala Val Ile	
465 470 475	
gga gag acc ttc aca atc tcc tgc cac tat ccg tgc aaa ttc tac tcc	1549
Gly Glu Thr Phe Thr Ile Ser Cys His Tyr Pro Cys Lys Phe Tyr Ser	
480 485 490	
cag gag aaa tac tgg tgc aag tgg agc aac gac ggc tgc cac atc ctg	1597
Gln Glu Lys Tyr Trp Cys Lys Trp Ser Asn Asp Gly Cys His Ile Leu	
495 500 505	
ccg agc cat gat gaa ggt gcc cgc cag tcc tct gtg agc tgt gac cag	1645
Pro Ser His Asp Glu Gly Ala Arg Gln Ser Ser Val Ser Cys Asp Gln	
510 515 520	
agc agc cag atc gtc tcc atg acc ctg aac ccg gtc aaa aag gaa gat	1693
Ser Ser Gln Ile Val Ser Met Thr Leu Asn Pro Val Lys Lys Glu Asp	
525 530 535 540	
gaa ggc tgg tac tgg tgt ggg gta aaa gaa ggt cag gtc tat gga gaa	1741
Glu Gly Trp Tyr Trp Cys Gly Val Lys Glu Gly Gln Val Tyr Gly Glu	
545 550 555	

act aca gcc atc tat gta gca gtt gaa gag agg acc aga ggg tca ccc	1789
Thr Thr Ala Ile Tyr Val Ala Val Glu Glu Arg Thr Arg Gly Ser Pro	
560 565 570	
cac atc aac ccg aca gat gca aac gca cgt gca aaa gat gct cca gag	1837
His Ile Asn Pro Thr Asp Ala Asn Ala Arg Ala Lys Asp Ala Pro Glu	
575 580 585	
gaa gag gca atg gaa tcc tct gtc agg gag gat gaa aac aag gcc aat	1885
Glu Glu Ala Met Glu Ser Ser Val Arg Glu Asp Glu Asn Lys Ala Asn	
590 595 600	
ctg gac ccc agg ctt ttt gca gac gaa aga gag ata cag aat gcg gga	1933
Leu Asp Pro Arg Leu Phe Ala Asp Glu Arg Glu Ile Gln Asn Ala Gly	
605 610 615 620	
gac caa gct cag gag aac aga gca tct ggg aat gct ggc agt gct ggt	1981
Asp Gln Ala Gln Glu Asn Arg Ala Ser Gly Asn Ala Gly Ser Ala Gly	
625 630 635	
gga caa agc ggg agc tcc aaa gtc cta ttc tcc acc ctg gtg ccc ctg	2029
Gly Gln Ser Gly Ser Ser Lys Val Leu Phe Ser Thr Leu Val Pro Leu	
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ggt ttg gtg ctg gca gtg ggt gct gtg gct gtg tgg gtg gcc aga gtc	2077
Gly Leu Val Leu Ala Val Gly Ala Val Ala Val Trp Val Ala Arg Val	
655 660 665	
cga cat cgg aag aat gta gac cgc atg tca atc agc agc tac agg aca	2125
Arg His Arg Lys Asn Val Asp Arg Met Ser Ile Ser Ser Tyr Arg Thr	
670 675 680	
gac att agc atg gga gac ttc agg aac tcc agg gat ttg gga ggc aat	2173
Asp Ile Ser Met Gly Asp Phe Arg Asn Ser Arg Asp Leu Gly Gly Asn	
685 690 695 700	
gac aac atg ggc gcc act cca gac aca caa gaa aca gtc ctc gaa gga	2221
Asp Asn Met Gly Ala Thr Pro Asp Thr Gln Glu Thr Val Leu Glu Gly	
705 710 715	
aaa gat gaa ata gag act acc acc gag tgt acc acc gag cca gag gaa	2269
Lys Asp Glu Ile Glu Thr Thr Thr Glu Cys Thr Thr Glu Pro Glu Glu	
720 725 730	
tcc aag aaa gca aaa agg tca tcc aag gag gaa gct gac atg gcc tac	2317
Ser Lys Lys Ala Lys Arg Ser Ser Lys Glu Glu Ala Asp Met Ala Tyr	
735 740 745	
tca gca ttc ctg ttt cag tcc agc aca ata gct gcg cag gtc cat gat	2365
Ser Ala Phe Leu Phe Gln Ser Ser Thr Ile Ala Ala Gln Val His Asp	
750 755 760	
ggt ccc cag gaa gcc tag gcagtgtga ccacctaccc ctgcctgtga	2413
Gly Pro Gln Glu Ala *	
765	
caatcaactt gagaatcaca ttgatccact cgcagccac cctcgcccat caccaggct	2473

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cttccctcct gttctcagag gtgtgctggt tctccctca gtcgtggaag cctggcctac 2533
ttatgcctgt ttaggagaga gcgtgaggag ttctttttgc tggttaaagag taaggtggaa 2593
atgagttgag cccaagaggt gtctctgaga gacgaggggt cagagcaggg gctcatttca 2653
ggaggaagag ccatttgaag cctctttata cacatatgct aggatgtcag gatagctctt 2713
ctcctccatc tctcctttct tctcttcttg attcagacaa cagatccgaa aactcactag 2773
gcttccggtg tctactaaat gctgagagtc aggccacagc ctttctataa acatcactgg 2833
aagagacacc acctcgtccc agattctgtc ttttccctaa gctatcaatc attaccgggg 2893
attccctttg cctctgcacc tcataggcaa caaaagaaac ataagtctctg cagtctaagg 2953
catacccaag ccataagggc accacgagac tcagatgaga agagattttt ctccagagta 3013
ctcagtgaga tagactagt tcaagccaga tggggcaact cctggctctt ggcctgggac 3073
ttgtcttcaa gatctctgct cttattagag aaagaacttt agcatgagga aaagtaagag 3133
aaaacaagtt acatgggcat ggtggtgtgc tcctgcaatc ccaatattaa gaggttaaaa 3193
aataggacca gaagtttaaa gtaatccttg gctacctagt gagtgttaagg ccagcctgga 3253
atcaataaga gttggt 3269

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<210> 10  
<211> 769  
<212> PRT  
<213> Rat

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Met Arg Leu Ser Leu Phe Ala Leu Leu Val Thr Val Phe Ser Gly Val
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Ser Thr Gln Ser Pro Ile Phe Gly Pro Gln Asp Val Ser Ser Ile Glu
20     25     30
Gly Asn Ser Val Ser Ile Thr Cys Tyr Tyr Pro Asp Thr Ser Val Asn
35     40     45
Arg His Thr Arg Lys Tyr Trp Cys Arg Gln Gly Ala Asn Gly Tyr Cys
50     55     60
Ala Thr Leu Ile Ser Ser Asn Gly Tyr Leu Ser Lys Glu Tyr Ser Gly
65     70     75     80
Arg Ala Ser Leu Ile Asn Phe Pro Glu Asn Ser Thr Phe Val Ile Asn
85     90     95
Ile Ala His Leu Thr Gln Glu Asp Thr Gly Ser Tyr Lys Cys Gly Leu
100    105    110
Gly Thr Thr Asn Arg Gly Leu Phe Phe Asp Val Ser Leu Glu Val Ser
115    120    125
Gln Val Pro Glu Phe Pro Asn Asp Thr His Val Tyr Thr Lys Asp Ile
130    135    140
Gly Arg Thr Val Thr Ile Glu Cys Arg Phe Lys Glu Gly Asn Ala His
145    150    155    160
Ser Lys Lys Ser Leu Cys Lys Lys Arg Gly Glu Ala Cys Glu Val Val
165    170    175
Ile Asp Ser Thr Glu Tyr Val Asp Pro Ser Tyr Lys Asp Arg Ala Ile
180    185    190
Leu Phe Met Lys Gly Thr Ser Arg Asp Ile Phe Tyr Val Asn Ile Ser
195    200    205
His Leu Ile Pro Ser Asp Ala Gly Leu Tyr Val Cys Gln Ala Gly Glu
210    215    220
Gly Pro Ser Ala Asp Lys Asn Asn Ala Asp Leu Gln Val Leu Glu Pro
225    230    235    240
Glu Pro Glu Leu Leu Tyr Lys Asp Leu Arg Ser Ser Val Thr Phe Glu
245    250    255
Cys Asp Leu Gly Arg Glu Val Ala Asn Asp Ala Lys Tyr Leu Cys Arg
260    265    270
Lys Asn Lys Glu Thr Cys Asp Val Ile Ile Asn Thr Leu Gly Lys Arg
275    280    285

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Asp Pro Ala Phe Glu Gly Arg Ile Leu Leu Thr Pro Arg Asp Asp Asn  
 290 295 300  
 Gly Arg Phe Ser Val Leu Ile Thr Gly Leu Arg Lys Glu Asp Ala Gly  
 305 310 315 320  
 His Tyr Gln Cys Gly Ala His Ser Ser Gly Leu Pro Gln Glu Gly Trp  
 325 330 335  
 Pro Val Gln Ala Trp Gln Leu Phe Val Asn Glu Glu Ser Thr Ile Pro  
 340 345 350  
 Asn Ser Arg Ser Val Val Lys Gly Val Thr Gly Gly Ser Val Ala Ile  
 355 360 365  
 Val Cys Pro Tyr Asn Pro Lys Glu Ser Ser Ser Leu Lys Tyr Trp Cys  
 370 375 380  
 His Trp Glu Ala Asp Glu Asn Gly Arg Cys Pro Val Leu Val Gly Thr  
 385 390 395 400  
 Gln Ala Leu Val Gln Glu Gly Tyr Glu Gly Arg Leu Ala Leu Phe Asp  
 405 410 415  
 Gln Pro Gly Ser Gly Ala Tyr Thr Val Ile Leu Asn Gln Leu Thr Thr  
 420 425 430  
 Gln Asp Ser Gly Phe Tyr Trp Cys Leu Thr Asp Gly Asp Ser Arg Trp  
 435 440 445  
 Arg Thr Thr Ile Glu Leu Gln Val Ala Glu Ala Thr Lys Lys Pro Asp  
 450 455 460  
 Leu Glu Val Thr Pro Gln Asn Ala Thr Ala Val Ile Gly Glu Thr Phe  
 465 470 475 480  
 Thr Ile Ser Cys His Tyr Pro Cys Lys Phe Tyr Ser Gln Glu Lys Tyr  
 485 490 495  
 Trp Cys Lys Trp Ser Asn Asp Gly Cys His Ile Leu Pro Ser His Asp  
 500 505 510  
 Glu Gly Ala Arg Gln Ser Ser Val Ser Cys Asp Gln Ser Ser Gln Ile  
 515 520 525  
 Val Ser Met Thr Leu Asn Pro Val Lys Lys Glu Asp Glu Gly Trp Tyr  
 530 535 540  
 Trp Cys Gly Val Lys Glu Gly Gln Val Tyr Gly Glu Thr Thr Ala Ile  
 545 550 555 560  
 Tyr Val Ala Val Glu Glu Arg Thr Arg Gly Ser Pro His Ile Asn Pro  
 565 570 575  
 Thr Asp Ala Asn Ala Arg Ala Lys Asp Ala Pro Glu Glu Glu Ala Met  
 580 585 590  
 Glu Ser Ser Val Arg Glu Asp Glu Asn Lys Ala Asn Leu Asp Pro Arg  
 595 600 605  
 Leu Phe Ala Asp Glu Arg Glu Ile Gln Asn Ala Gly Asp Gln Ala Gln  
 610 615 620  
 Glu Asn Arg Ala Ser Gly Asn Ala Gly Ser Ala Gly Gly Gln Ser Gly  
 625 630 635 640  
 Ser Ser Lys Val Leu Phe Ser Thr Leu Val Pro Leu Gly Leu Val Leu  
 645 650 655  
 Ala Val Gly Ala Val Ala Val Trp Val Ala Arg Val Arg His Arg Lys  
 660 665 670  
 Asn Val Asp Arg Met Ser Ile Ser Ser Tyr Arg Thr Asp Ile Ser Met  
 675 680 685  
 Gly Asp Phe Arg Asn Ser Arg Asp Leu Gly Gly Asn Asp Asn Met Gly  
 690 695 700  
 Ala Thr Pro Asp Thr Gln Glu Thr Val Leu Glu Gly Lys Asp Glu Ile  
 705 710 715 720  
 Glu Thr Thr Thr Glu Cys Thr Thr Glu Pro Glu Glu Ser Lys Lys Ala  
 725 730 735  
 Lys Arg Ser Ser Lys Glu Glu Ala Asp Met Ala Tyr Ser Ala Phe Leu

740                      745                      750  
 Phe Gln Ser Ser Thr Ile Ala Ala Gln Val His Asp Gly Pro Gln Glu  
              755                      760                      765  
 Ala

<210> 11  
 <211> 322  
 <212> DNA  
 <213> Mouse

<220>  
 <221> CDS  
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<400> 11  
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           Asp Ile Val Met Thr Gln Ser Pro Ala Ile Met Ser Ala Ser  
           1                      5                      10  
  
 cca ggg gag aag gtc acc ata acc tgc agt gcc agc tca agt gta agt 97  
 Pro Gly Glu Lys Val Thr Ile Thr Cys Ser Ala Ser Ser Ser Val Ser  
   15                      20                      25                      30  
  
 tac atg cac tgg ttc cag cag aag cca ggc act tct ccc aaa ctc tgg 145  
 Tyr Met His Trp Phe Gln Gln Lys Pro Gly Thr Ser Pro Lys Leu Trp  
                           35                      40                      45  
  
 ctt tat agc aca tcc aac ctg gct tct gga gtc cct gct cgc ttc agt 193  
 Leu Tyr Ser Thr Ser Asn Leu Ala Ser Gly Val Pro Ala Arg Phe Ser  
                           50                      55                      60  
  
 ggc agt gga tct ggg acc tct tac tct ctc aca atc agc cga atg gag 241  
 Gly Ser Gly Ser Gly Thr Ser Tyr Ser Leu Thr Ile Ser Arg Met Glu  
                           65                      70                      75  
  
 gct gaa gat gct gcc act tat tac tgc cat caa agg act agt tac ccg 289  
 Ala Glu Asp Ala Ala Thr Tyr Tyr Cys His Gln Arg Thr Ser Tyr Pro  
                           80                      85                      90  
  
 tac acg ttc gga ggg ggg acc aag ctg gaa a ta 322  
 Tyr Thr Phe Gly Gly Gly Thr Lys Leu Glu  
   95                      100

<210> 12  
 <211> 105  
 <212> PRT  
 <213> Mouse

<400> 12  
 Asp Ile Val Met Thr Gln Ser Pro Ala Ile Met Ser Ala Ser Pro Gly  
   1                      5                      10                      15  
 Glu Lys Val Thr Ile Thr Cys Ser Ala Ser Ser Ser Val Ser Tyr Met  
                           20                      25                      30  
 His Trp Phe Gln Gln Lys Pro Gly Thr Ser Pro Lys Leu Trp Leu Tyr



<210> 14  
 <211> 132  
 <212> PRT  
 <213> Mouse

<400> 14  
 Met Glu Trp Thr Trp Val Phe Leu Phe Leu Leu Ser Gly Thr Ala Gly  
 1 5 10 15  
 Val His Ser Gly Val Gln Leu Gln Gln Ser Gly Pro Asp Leu Val Lys  
 20 25 30  
 Pro Gly Ala Ser Val Lys Ile Ser Cys Lys Ala Ser Gly Tyr Thr Phe  
 35 40 45  
 Thr Asp Tyr Asn Ile His Trp Val Lys Gln Ser Arg Gly Lys Ser Leu  
 50 55 60  
 Glu Trp Ile Gly Tyr Ile Tyr Pro Tyr Asn Gly Asn Thr Tyr Tyr Asn  
 65 70 75 80  
 Gln Lys Phe Lys Asn Lys Ala Thr Leu Thr Val Asp Asn Ser Ser Thr  
 85 90 95  
 Ser Ala Tyr Met Glu Leu Arg Ser Leu Thr Ser Glu Asp Ser Ala Val  
 100 105 110  
 Tyr Tyr Cys Ala Thr Tyr Phe Asp Tyr Trp Gly Gln Gly Thr Thr Leu  
 115 120 125  
 Thr Val Ser Ser  
 130

<210> 15  
 <211> 31  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Primer

<400> 15  
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<210> 16  
 <211> 30  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Primer

<400> 16  
 cccaagcttg gttttggaga tggttttctc 30

<210> 17  
 <211> 31  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Primer



<400> 17	
gataagcttg gtcctactcc tcctcctcct a	31
<210> 18	
<211> 30	
<212> DNA	
<213> Artificial Sequence	
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<400> 18	
aatctcgagt cagtagcaga tgccatctcc	30
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<213> Artificial Sequence	
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<223> Primer	
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